



# Pawnee-Buckner River Subbasin

## Management Recommendations

Pawnee County Version

January 12, 2004

---

Subbasin Water Resource Management Program  
Division of Water Resources  
Kansas Department of Agriculture  
109 SW Ninth Street - 2<sup>nd</sup> Floor  
Topeka, KS 66612-1283

## **Table of Contents**

<b>I. INTRODUCTION .....</b>	<b>1</b>
<b>II. BACKGROUND .....</b>	<b>1</b>
A. Pawnee County .....	1
B. Hodgeman/Ness County .....	2
C. State Water Plan .....	2
<b>III. HYDROGEOLOGY .....</b>	<b>2</b>
A. Aquifer Systems .....	2
B. Ground Water .....	3
<b>IV. WATER RIGHTS AND APPROPRIATED QUANTITIES .....</b>	<b>4</b>
<b>V. DROUGHT CONTINGENCY PLAN .....</b>	<b>5</b>
<b>VI. ENHANCED IRRIGATION CONSERVATION AND EFFICIENCY .....</b>	<b>8</b>
<b>VII. FIVE-YEAR WATER RIGHT PROGRAM .....</b>	<b>8</b>
<b>VIII. PLAN IMPLEMENTATION .....</b>	<b>9</b>
<b>IX. NON-COMPLIANCE .....</b>	<b>9</b>
<b>X. COMMITTEE RECOMMENDATIONS .....</b>	<b>10</b>
A. Advisory Committee .....	10
B. Representative Terms .....	11
C. Additional Recommendations .....	11
<b>References .....</b>	<b>12</b>
<b>Appendix A: Pawnee/Buckner Subunit Boundaries Map .....</b>	<b>13</b>
<b>Appendix B: Drought Level Points by Subunit/Water Rights Authorized in each subunit ....</b>	<b>14</b>
<b>Appendix C: Meter Order Example/Chart of average water levels .....</b>	<b>15</b>
<b>Tables</b>	
Table 1: Authorized quantity by county for all certified water use types .....	5
Table 2: NIR and Priority of Water Rights by County for DCP reductions .....	7

## **I. INTRODUCTION**

The ground water resources of the Pawnee-Buckner River subbasin in Pawnee, Hodgeman and Ness counties are recognized to be vital in maintaining the area's economy. Major stream systems include Pawnee River (Creek), Buckner Creek and Sawlog Creek. Residents of the subbasin are highly dependent on the ground water resources for irrigation, municipal, industrial and domestic use. The Division of Water Resources and Big Bend Groundwater Management District No. 5 have data supporting that ground water resources in the subbasin are fully appropriated and increased management initiatives are necessary to assure an adequate supply for future generations at current level of appropriations. Water levels can be severely impacted during extended droughts due to increased withdrawals, creating more stress on the aquifer system and making recovery of water levels more difficult to obtain. Special programs are needed to address the fluctuations in water levels during these drought periods. The implementation of conservation programs and adoption of a drought contingency plan (DCP) will help preserve the water resources of the area and maintain stability in the economy. This plan does not attempt to address changes in water levels occurring since predevelopment. It is designed only to reduce the impact of increased pumping on the aquifer during drought conditions.

## **II. BACKGROUND**

### **A. Pawnee County**

In 1976, residents of Pawnee County voted to become part of the Big Bend Groundwater Management District No. 5 (District). The residents recognized the need for local input in managing the ground water resources of the area. The District was created to promote conservation and prevent economic deterioration through the stabilization of agriculture. Over the years, programs have been adopted and implemented by the District's Board of Directors in an effort to prevent long-term ground water declines. Programs implemented for Pawnee River Valley (PRV) include an aggressive safe-yield program designed to prevent long term water level declines and a well spacing regulation to prevent direct impairment. However, much of the agricultural development had taken place prior to the formation of the District and was not impacted significantly by these policies.

At the request of the District, the chief engineer, Division of Water Resources (DWR), Board of Agriculture in 1980, established an Intensive Groundwater Use Control Area (IGUCA) in the PRV. Changes to the safe-yield program in 1984 and eventually the closure of the subbasin in 1990 to further appropriation have been the result of continuous efforts to address water level declines in many areas of the subbasin. The area remains closed to further appropriations with the exception of small use applications. Amendments to the Pawnee River IGUCA order would need to be established prior to implementation of the DCP and would follow the formal procedures outlined in the Groundwater Management District Act (K.S.A. 82a 1036 to 1040).

### **B. Hodgeman/Ness County**

Portions of Hodgeman County were once included within the boundaries of Southwest Kansas Groundwater Management District No. 3. Local residents requested to be removed from Groundwater Management District No. 3 based on differences between the Ogallala aquifer and the Buckner Creek alluvium. In 1988, the chief Engineer changed the boundaries of Groundwater Management District No. 3 to reflect the exclusion of Hodgeman County.

Groundwater Management District No. 3 continues to have local authority to regulate water rights within Ford, Gray and Finney counties, which encompass upper reaches of Pawnee River, Buckner Creek and Sawlog Creek.

In 1989, Kansas Department of Agriculture's Division of Water Resources (KDA-DWR) established a moratorium on future appropriations from Buckner Creek, Sawlog Creek, Pawnee River, their tributaries, alluviums and other hydraulically connected sources of water supply in Ness and Hodgeman counties. On October 25, 2002 the area was closed to future appropriations (K.A.R. 5-3-26).

### **C. State Water Plan**

In July 1994, State Water Plan directed the need for further water resource management in the Pawnee River Valley. KDA-DWR was the agency identified as most appropriate to address the guidelines:

*Implement a water management policy in the Pawnee River Alluvial Corridor that comprehensively addresses the differences in the area. Recommendations of the Hodgeman/Ness County Advisory Committee should be seriously considered. Status of the Pawnee River Valley Intensive Groundwater Use Control Area should be reviewed during the investigation (Kansas Water Plan, FY 96).*

In 1993, the Kansas Legislature authorized the formation of the Subbasin Water Resources Management Program (SWRMP). The program is a special project funded by the State Water Plan and implemented by KDA-DWR. The SWRMP is designed to use a proactive approach in developing long-term management strategies that further address water issues in selected subbasins. The SWRMP was established in the Pawnee-Buckner subbasin in 1996.

## **III. HYDROGEOLOGY**

### **A. Aquifer Systems**

Three aquifer systems exist in the Pawnee-Buckner subbasin, the alluvial, Ogallala-High Plains and the Dakota aquifer.

The hydrogeology of the Pawnee River Valley is best described in "Ground-Water Resources of Pawnee Valley, Kansas by V.C. Fishel" as follows:

*"The area consists of gently rolling upland plains together with relatively flat flood plains and terraces. The largest water bearing formations in this area range geologically, in age from Cretaceous to Quaternary. The Cretaceous rocks are exposed in the uplands in, northern Pawnee County while the alluvium and terrace deposits underlie the principal valleys*

*and the adjacent areas. The alluvial aquifer yields large quantities of water to wells. Other water bearing formations generally yield only small to moderate quantities of water to wells. The saturated thickness of the alluvium has a maximum thickness of 120 feet.” (Pg 7)*

The alluvium of Pawnee River Valley has a width of as much as three miles in part of Pawnee County and as much as two miles in Hodgeman and Ness counties. The thickness of the alluvium ranges from 65 to 138 feet in Pawnee County to a maximum of 100 feet in Hodgeman and Ness counties.

The Dakota formation outcrops in isolated areas in Pawnee County but underlies all of the Pawnee River Valley and has a maximum thickness of approximately 200 feet (pg 20).

The Dakota aquifer is both unconfined and confined in different portions of the subbasin. The confined Dakota is located in the western portion and the unconfined begins in eastern Hodgeman County and continues into Pawnee County. The Dakota and alluvial aquifers are hydraulically connected in some areas where the Dakota is unconfined. Sustainable water levels in the confined Dakota aquifer are present due to water moving from the unconfined aquifer to the confined. The same phenomena have occurred between confined Dakota and Ogallala aquifers in the western portion of the subbasin. In addition, the Dakota aquifer discharges to the Buckner and Sawlog Creeks in southwestern Hodgeman County.

Any well withdrawing solely from the Dakota aquifer shall be exempt from the restrictions in this plan if it can be proven by the well owner that the well meets the Districts regulation K.A.R. 5-25-4 (8). The well owner shall also submit a water well completion log (WWC5) to verify well construction.

The Ogallala aquifer is present in the western portion of the subbasin and along the alluvial interfaces of the Pawnee-Buckner alluvium.

## **B. Ground Water**

Between 1980 and 1988, the alluvial water levels either showed seasonal variations or a gradual decline along Buckner Creek and Pawnee River, while the years 1988 to 1992 show significant declines in water levels. Following 1992, the water levels increased significantly, attributed to large precipitation events in 1993, 1994 and 1997. The increase occurred following a large quantity of snowfall in winter of 1991-1992 and flooding in 1993. The precipitation ranges from 20 inches per year in Hodgeman County to 22 inches per year in Pawnee County. The average precipitation in the subbasin is approximately 21 inches per year. The average precipitation values are based on the Kalvesta, Bazine, Jetmore and Burdett stations.

Climatic conditions play an important role in the Pawnee-Buckner subbasin. When significant precipitation events occur, the alluvial system recharges leaving water stored in alluvial aquifer system to be used during dry periods. These significant precipitation events result in increased recharge to the alluvium and other areas able to detain water. If extended dry periods prevail, and the water table is significantly depleted, a substantial precipitation event(s) is necessary to replenish the system in order to support existing appropriations. Historically, when an extended

dry period occurred, water levels declined due to an increase reliance on the water stored in the alluvial aquifer system with minimal recharge to the ground water system.

Recharge numbers represent vertical infiltration of precipitation falling on the land surface. Examinations of hydrographs illustrate four large recharge events that occurred during this time and account for most of the water level changes. These recharge events were all associated with periods of high streamflow (April 1987, July 1992, August 1993 and November 1996). Recharge does occur at the surface, but with the top 30 feet of the lithologic column consisting of clay, infiltration could take many months to reach alluvial aquifer system. Therefore, it would appear flows from the Pawnee River and Buckner Creek have an immediate impact on recharge to the alluvial aquifer system.

The “Fishel” report further states significance of ground water levels (p. 42-43):

*“The water table in Pawnee Valley is not a stationary surface, but a surface that fluctuates up and down much like the water level in a lake or reservoir. However, over a long period a condition of approximate equilibrium exists between the amount of water that is added annually to ground-water storage and the amount that is discharged annually by natural means. In general, the water table rises when the amount of recharge exceeds the amount of discharge and declines when the discharge is greater than the recharge. Thus, changes in the water levels in wells indicate to what extent the ground-water reservoir is being depleted or replenished.*

*The factors controlling the rise of the water table in Pawnee Valley are (1) the amount of precipitation within the valley that infiltrates through the soil and descends to the water table; and (2) the amount of influent seepage that reaches the aquifer system from the Pawnee River and its tributaries. In the Pawnee Valley the water table is generally overlain by several feet of silt and clay, which retards and limits the movement of water down to the water table.”*

#### IV. WATER RIGHTS AND APPROPRIATED QUANTITIES

The Pawnee Watershed encompasses approximately 2,701 sq miles or 1,728,776 acres. There are approximately 741 water rights authorizing 943 points of diversion in the Pawnee Watershed, of which 151 are vested. Water appropriations for Hodgeman, Ness and Pawnee counties total 109,100 acre-feet, with 106,309 acre-feet appropriated for irrigation use and represents 97 percent total authorized in the subbasin (Table 1). Approximately 10,042 acre-feet appropriated is for surface water use.

County	Authorized AF	No. Water Rights	Irr	Rec	Mun	Stk	Ind	Dom
Hodgeman	57,122	379	54865	742	397	1076	30	12
Ness	8,187	65	8187					
Pawnee	43,791	297	43257	135	361	13		25

<b>Total</b>	<b>109,100</b>	<b>741</b>	<b>106,309</b>	<b>877</b>	<b>758</b>	<b>1089</b>	<b>30</b>	<b>37</b>
--------------	----------------	------------	----------------	------------	------------	-------------	-----------	-----------

**Table 1:** Authorized quantity by county for all certified water use types

## V. DROUGHT CONTINGENCY PLAN (DCP)

The amount of recharge to the aquifer system is in response to annual precipitation events, with intensity, time and duration all having an influence on the actual quantity reaching the aquifer. Since the annual amount of recharge cannot always be guaranteed, other methods must be evaluated to assure that drought conditions do not have prolonged effects on the aquifer. An enhanced management plan reducing water use will be the most effective in sustaining water level fluctuations during drought conditions.

The following plan is recommended for implementation in the Pawnee-Buckner River subbasin to reduce the impact on the aquifer system from ground water pumpage during drought conditions.

1. Historically, low water levels were recorded in January 1992. It was determined by the working group representatives that a 40 percent reduction of the saturated thickness would be used to determine an average water level that will be used as the drought level point (DLP) in each hydrologic unit to implement the drought contingency plan (DCP). The water bearing sand point elevation to bedrock or top of the clay zone where bedrock information is not available will be used to determine saturated thickness.

Current water level measurements are taken from 37 observation wells with additional measurements taken by the District throughout the subbasin. The committee shall determine the actual number and location of the observation wells used for this program with assistance from the District and DWR. The DLP value will be the average of the 40 percent depletion of the water bearing sand for each selected observation well within a hydrologic unit.

Water level measurements taken between January 15<sup>th</sup> and February 1<sup>st</sup> of each year will be used to determine the average annual change in each hydrologic unit and if the drought contingencies plan, should it be invoked. Water users will be notified by March 1<sup>st</sup> if DCP is to be implemented. If the subbasin receives significant recharge to raise the water table above the pre-determined drought level point (DLP) the advisory committee can recommend not implementing the drought contingency plan to the chief engineer. Water users will be notified by April 1<sup>st</sup> of the same year the DCP is implemented, if the chief engineer accepts the recommendation.

2. The subbasin shall be managed by 10 hydrologic units (subunit) and be used to determine where water right restrictions should be imposed (Appendix A). The subunits are defined by a combination of USGS hydrologic unit code 14 contained within the Pawnee Watershed. A Drought Level Point will be assigned to each subunit representing the average water level for that area (Appendix B). Each subunit will be then be addressed separately. Lithologic logs will be used to determine sand point to top of bottom clay layer or bedrock elevation. A drought level point will be established based on the information provided by lithologic log.

3. If the water table remains below the trigger level for a second year in the same hydrologic subunit, then the first year water use reductions should apply to adjoining contingent upstream and downstream subunits. If the water table remains below the trigger level for a third year the first adjoining contingent upstream and downstream regions may be reduced by the second years cut's of the management reductions in the following year. The second adjoining contingent upstream and downstream subunit may be reduced by the first year's reduction of the management reduction in the following year.
4. Owners of surface and ground water vested rights will be required to file water conservation plans with the chief engineer upon adoption of this management plan. The conservation plan shall be monitored for compliance to ensure enactment of conservation plan and enhanced compliance during drought contingency plan. The Division of Water Resources will provide an outline of the conservation plan guidelines on date of approval of management plan by the chief engineer.
5. Municipalities with wells in the Pawnee Watershed shall be required to file conservation plans with the chief engineer upon adoption of this plan.
6. Owners of non-vested water rights shall be subject to the following water use restrictions when average February water levels are at or below the DLP in a priority sub-area.
  - A. Water use restrictions shall be based on the Kansas Irrigation Guide (Table 1) using net irrigation requirements (NIR, 50 percent chance rainfall) for Pawnee, Hodgeman and Ness counties on the highest reported acres between 1996 and 2000. Restrictions will be based on water right priority.

<b>Junior water right:</b>	<b>January 1, 1981 to present date.</b>
<b>Intermediate water right:</b>	<b>January 2, 1963 – December 31, 1980</b>
<b>Senior water right</b>	<b>1945 to January 1, 1963 excluding vested right</b>
<b>Vested water right</b>	<b>prior to 1945</b>

B. Drought Contingency Plan water use restrictions shall be (Table 2):

<b>Year One:</b>	<b>Priority</b>	<b>County</b>	<b>NIR Crop</b>	<b>Nir VAlue</b>
	Senior	Pawnee	NIR for Corn / .85	14.94"
	Intermediate	Pawnee	NIR for Corn	1 2 . 7 "



	Junior	Pawnee	NIR for Sorghum	1 0 . 6 "
	Senior Intermediate Junior	Hodgeman Hodgeman Hodgeman	NIR for Corn / .85 NIR for Corn NIR for Sorghum	15.76" 13.4" 11.5"
	Senior Intermediate Junior	Ness Ness Ness	NIR for Corn / .85 NIR for Corn NIR for Sorghum	15.65" 13.3" 11.3"
<b>Year Two:</b>	Senior Intermediate Junior	Pawnee Pawnee Pawnee	NIR for Corn NIR for Sorghum NIR for Sorghum	12.7" 10.6" 10.6"
	Senior Intermediate Junior	Hodgeman Hodgeman Hodgeman	NIR for Corn NIR for Sorghum NIR for Sorghum	13.4" 11.5" 11.5"
	Senior Intermediate Junior	Ness Ness Ness	NIR for Corn NIR for Sorghum NIR for Sorghum	13.3" 11.3" 11.3"
<b>Year Three:</b>	Senior Intermediate Junior	Pawnee Pawnee Pawnee	NIR for Corn NIR for Sorghum NIR for Soybeans	12.7" 10.6" 9.7"
	Senior Intermediate Junior	Hodgeman Hodgeman Hodgeman	NIR for Corn NIR for Sorghum NIR for Soybeans	13.4" 11.5" 10.7"
	Senior Intermediate Junior	Ness Ness Ness	NIR for Corn NIR for Sorghum NIR for Soybeans	13.3" 11.3" 10.4"

**Table 2:** Net Irrigation Requirements and priority of water rights by County for DCP reductions

7. Any well withdrawing solely from the Dakota shall be exempt from the restrictions in this plan if it can be proven by the well owner that the well meets the Districts regulation 5-25-4 (8). The well owner shall submit a water well completion log (wwc5) to verify well construction.

8. All water right restrictions shall be removed if water levels increase by one foot over the DLP. Water levels are taken between January 15<sup>th</sup> and February 1<sup>st</sup>. If a significant rainfall event occurs, the District and the DWR will conduct well measurements to determine if water levels have risen one foot above DLP.

## **VI. ENHANCED IRRIGATION CONSERVATION AND EFFICIENCY**

Water conservation efforts have routinely been exercised throughout the Pawnee Watershed. However, increased efforts are necessary in order to sustain higher water levels. Utilization of existing weather stations should be promoted for irrigation scheduling. Educational activities should be conducted in the subbasin to promote irrigation scheduling and the most effective conservation measures. Cost share money should be directed to the subbasin to help offset the costs associated with irrigation upgrades and water reduction initiatives.

Between 1997 and 2002 approximately 54 system conversions have been made in the subbasin. The estimated total savings from system conversions is 4,488 acre-feet or 83 acre-feet/conversion. The average increase in irrigation efficiency is 21 percent. The following are estimated increase in efficiency based on system conversion:

- Flood to Center Pivot 15-40 percent
- Flood to Center Pivot w/end gun 8-23 percent
- Flood to Subsurface Drip 45 percent
- Impact to Drop Nozzle
  - 9 feet above land surface 10 percent
  - 4 feet above land surface 15-20 percent
- Lowering of Drop Nozzles
  - 9 feet to 2 feet 10 percent

The committee promotes continued construction of watershed dams throughout the Pawnee-Buckner subbasin. The Pawnee Watershed district office has shown that watershed dams contribute significantly to recharge in the immediate surrounding alluvial aquifer. The focus should be that dams are built and operated specifically for recharge to alluvial aquifer and not just flood control.

## **VII. FIVE YEAR WATER RIGHT PROGRAM**

K.S.A. 2001 Supp. 82a-736 allows water users to deposit water into multi-year flex accounts and utilize water by means of a term permit over a five-year period with no annual limitation on the quantity of water used. Entry into the program requires 10 percent water conservation component, proper and adequate meter, and can be filed no later than **October 10** of the year proceeding the first year for which the application is made.

If the drought contingency plan is enacted water users participating in the Flex account program will not be exempt from water use restrictions. Water use will be based on water use restrictions as outlined in the IGUCA.

## VIII. PLAN IMPLEMENTATION

Upon the implementation of the management plan, the committee shall request a hearing be held by the chief engineer to amend changes to the current Pawnee River IGUCA order and to extend the boundaries to include Hodgeman and Ness counties which fall within the Pawnee-Buckner subbasin boundaries.

DWR shall notify all water users, by mail, in the Pawnee-Buckner River subbasin of the hearing, proposed changes to the current Pawnee River IGUCA order and authorized quantities.

All conservation plans required for the vested rights and municipalities must be submitted within one year after the revised order is enacted. All other water users shall be notified of the number of base acres for each water right as determined by the drought contingency plan.

Pawnee-Buckner representatives, the District and DWR will design the monitoring well network. The District and DWR will measure the wells between January 15<sup>th</sup> and February 1<sup>st</sup> each year and submit a report of hydrologic analysis to chief engineer.

The committee shall meet within two weeks after completion of water measurements to determine if the implementation of the DCP is necessary. If DCP is to be implemented, DWR shall notify water users by certified mail by March 1<sup>st</sup>.

DWR shall notify water users by certified mail when restrictions are lifted.

## IX. NON-COMPLIANCE

A water right that has over-pumped allocation during the implementation of the DCP shall be subject to further reductions in water use. Violations will require additional reductions based on the following formula and, if necessary, shall be carried over into subsequent years if implementation period of the DCP continues. If water right have over-pumped and are subject to restrictions the following year and the DCP has been lifted those water users will be subject to continued pumping restrictions based on authorized quantity as outlined below for the following year. A clean slate is created during each DCP period.

First violation = 2 x the amount over-pumped

Second violation = 3 x the amount over-pumped

Third violation = pumping is ceased for one year

**Example:** A water right with 100 acre-feet, during the second year of DCP implementation, is over-pumped by 10 acre-feet. The allocation for the next year of program implementation would be the NIR requirement minus 20 acre-feet.

### A. Implementation of Meter Order in Hodgeman and Ness Counties

It is recommended that the use of flow meters be utilized on all new wells. In addition, flow meters should be utilized on all existing wells. One meter will be required per point of

diversion, unless “water is being diverted from multiple points of diversion authorized by one water right that does not limit the maximum annual quantity and maximum rate of diversion by point of diversion, and all water flows to a common point where a water flowmeter meeting the requirements of K.A.R. 5-1-4 and K.A.R. 5-1-6 measures all of the water pumped from all points of diversion authorized by that water right” (K.A.R. 5-1-7) (Appendix C). A period of four years, from the acceptance of this management plan by the chief engineer, water users shall install flow meters that meet the specifications of rules and regulations (K.A.R. 5-1-4 through K.A.R. 5-1-12).

Flow meters are required on all wells within the Districts boundaries. This would allow for accuracy of water use reporting and implementation of drought contingency plan in the entire subbasin.

It is recommended that single wells that are state certified at 200 gpm or less shall be exempted from flow meter requirements and electric meters shall be acceptable.

## **X. COMMITTEE RECOMMENDATIONS**

The following recommendations are recognized as beneficial in the continued protection of the water resources in the Pawnee-Buckner River subbasin.

### **A. Advisory Committee**

In February 1999, a committee was established to address water resource management issues in the Pawnee-Buckner subbasin and to develop water management strategies. The goal established by the committee was to develop proactive management strategies for long-term water resource management which conserves water and maintains the availability of water for residents of the subbasin.

The initial advisory committee was formed because of the SWRMP process to represent the Pawnee-Buckner subbasin in the development of comprehensive water management strategies. Robert Lewis, Larry Skelton, Lee Olsen and Jim Froetschner currently represent the residents of Pawnee County. Jim Cure, Lon Ruff, Tyler Selfridge and Walt Salmans represent Hodgeman County. Gary McJunkin and Larry Frusher represent Ness County. Representatives from Water Pack, the District and KDA-DWR were present at the meetings as technical advisors. The goal of the committee is to develop alternatives to protect future water supplies and maintain economic stability through water conservation and incentive based programs. It is recommended that the advisory committee continue to meet annually to review water level data, climatic changes, water use and other relevant data to recommend future needs as outlined in the proposed management plan to the chief engineer.

### **B. Representative Terms**

Committee representatives must reside within the Pawnee-Buckner subbasin. Representatives shall be appointed by the water right owners within the subbasin and shall serve two-year term,

or until a successor is appointed. The committee will consist of ten members, four from Pawnee County, four from Hodgeman County and two from Ness County. The chief engineer shall appoint the first term representative upon approval of the management plan. Elections shall be held each year for two members of Hodgeman and Pawnee counties. Ness County will elect one member every other year.

An eligible voter shall be any person who owns a water right, as per K.S.A. 82(a)-701 et seq within the boundaries of the subbasin. Each qualified voter shall be entitled to vote for as many candidates as the number of representatives are to be elected, but may cast only one vote for each representative. Duly authorized voters may also cast one vote for estates, trusts, municipalities and public corporations with water rights. Proxy voting shall be allowed.

The annual elections shall be held in conjunction with the Pawnee/Ness/Hodgeman Irrigation Association annual meeting. Notice of the meeting shall be published by DWR in at least one newspaper of general circulation in the subbasin prior to the meeting.

### **C. Additional Recommendations**

1. The Committee promotes continued construction of watershed dams throughout the Pawnee-Buckner subbasin. The Pawnee Watershed district office has shown that watershed dams contribute significantly to recharge of surrounding alluvial aquifer. The focus should be that dams are built and operated specifically for recharge to alluvial aquifer and not just flood control.
2. Plugging of all Cedar Hills saltwater disposal wells in the subbasin should be recommended to the Kansas Corporation Commission to prevent potential contamination.
3. Exempt water rights within one mile of the Pawnee River from K.A.R. 5-25-2 (b) to allow water rights to be moved away from the stream. No water rights will be allowed to move closer to the stream. Program would only apply to Pawnee County water users.
4. Recommend that the State's Water Right Purchase Program be implemented to purchase water rights from within one mile of the Pawnee River.
5. Recommend encouragement of conserving water by utilizing center pivot systems with drop nozzles, subsurface drip irrigation, surge valves, watershed dams, terraces, and implement any future irrigation technology. The Pawnee Watershed representatives should sponsor irrigation seminars to promote new technology in irrigation.
6. The committee recommends future appropriations to be allowed in the entire Pawnee-Buckner subbasin for new well applications. As systems that are more efficient are installed (i.e. sprinkler system, surge valves and subsurface drip irrigation), the rate water is pumped from the aquifer is lessened. Therefore, dryland acres could be converted to irrigate acres if using center pivots, surge valves or subsurface drip

irrigation with a minimum 90 percent efficiency. This would enable water users to increase irrigated acres and use same quantity of water allocated. To increase economic benefit of the subbasin more water should be allocated to irrigate more acres where they meet the current existing rules and regulations of well spacing and safe yields.

### **References**

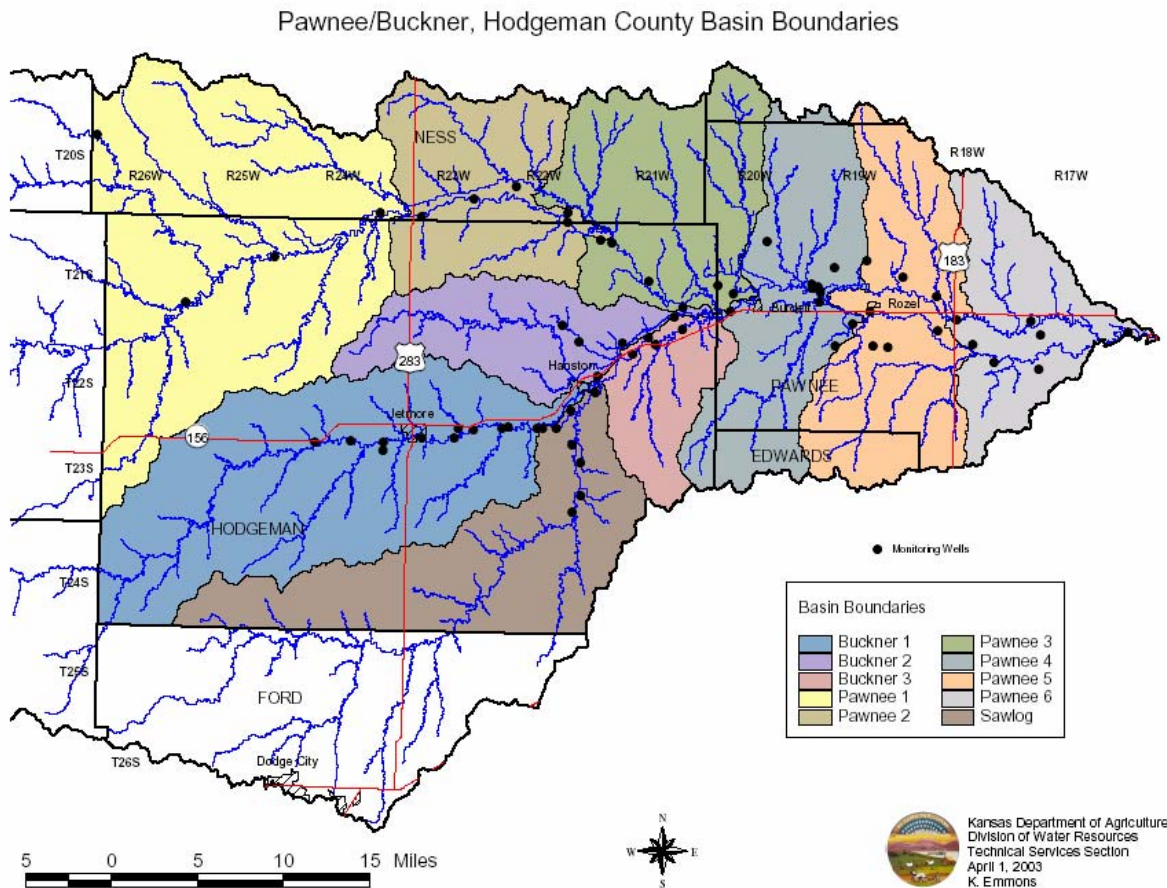
Fishel, V.C., “Groundwater Resources of Pawnee Valley, KS”, 1952, p. 7, 20, 42-43.

Kansas Water Office, “Kansas Water Plan, Fiscal Year 1996”, approved by the Kansas Water Authority July 1994.

Kansas Department of Agriculture, Rules and Regulations, amended October 25, 2002, Division of Water Resources.

National Engineer Handbook, State Supplement, table KS4-2 “Seasonal Net Irrigation Requirements (inches) 50 percent Chance Rainfall”, Part 652 Irrigation Guide, USDA, Natural Resources Conservation Service.

### **Appendix A**



## Appendix B

### **Drought Level Points (DLP):**

Pawnee 1: Upper Pawnee River subunit (HG/NS)

	35 Water Rights and 3 vested rights DLP = 35.298' BLS
Pawnee 2:	Middle Pawnee River subunit (HG/NS) 41 Water Rights and 27 vested rights DLP = 43.456' BLS
Pawnee 3:	Lower Pawnee River subunit (HG/NS) 58 Water Rights and 23 vested rights DLP = 66.518' BLS
Pawnee 4:	60 water rights and 8 vested rights (PN) DLP = 50.44' BLS
Pawnee 5:	94 water rights and 20 vested rights (PN) DLP = 49.74' BLS
Pawnee 6:	67 water rights and 17 vested rights (PN) DLP = 46.98' BLS
Buckner 1:	Upper Buckner Creek subunit (HG) 87 Water Rights and 18 vested rights DLP = 41.041' BLS
Buckner 2:	Middle Buckner Creek subunit (HG) 37 Water Rights and 9 vested rights DLP = 50.602' BLS
Buckner 3:	Lower Buckner Creek subunit (HG) 27 Water Rights and 14 vested rights DLP = 54.516' BLS
Sawlog:	Sawlog Creek subunit (HG) 63 Water Rights and 12 vested rights DLP = 47.81

### **Appendix C**

Meter Order Examples:



An operator has two wells that run a center pivot system under one place of use. Operator will need to place the meter at a point where a total quantity of water can be measured from the two wells (Figure 1).

